"Poster" preferred
S. Honda

EFFECTS OF RAIIIA'I'1ON AND OXIDATIVE STRESS ON DEVELOPMENT & MORI)IO1, OGY OF INTESTINAL CELLS

S. Shuji Honda, Gregory Nelson and Wayne. Schubert, Jet Propulsion I aboratory, Pasadena, CA 91109.

Intestinal cells when subjected to oxidative stress or radiation exhibit abnormal nuclear divisions observed as: 1) supernumerary ccl] divisions in ante.1 ior intestinal cells or 2) incomplete nuclear division and the persistence of anaphase bridges between the daughter nuclei, Two oxygen sensitive mutants, *mev-1* and *rad-8* were observed to exhibit spontaneous supernumerary nuclear divisions at low frequency, N2 can be induced to undergo these divisions by treatment with the superoxide dismutase (SOD) inhibitor diethyl dithiocarbamate or with the free radical generator methyl viologen. By contrast, the free radical generator bleomycin produces anaphase bridges in N2 intestinal nuclei at high frequency.

Intestinal anaphase bridges can be induced by ionizing radiation and their formation is dependent on dose and radiation type. The frequency of radiation induced bridge formation can be suppressed by the absence of oxygen or presence of free radical scavengers such as DMSO. ionizing radiation experiments measuring the oxygen enhancement ratio indicate that 3/4 of damage is caused by scavengable free radicals. The mutant *mev-1* which has only about half of the normal SOD levels inhibits a high spontaneous rate of bridge formation showing an anterior-posterior gradient. The frequency Of bridge formation is a function of oxygen concentration. These results implicate free radical damage in the perturbation of normal cell division control and chromosome damage.